FIG. 1

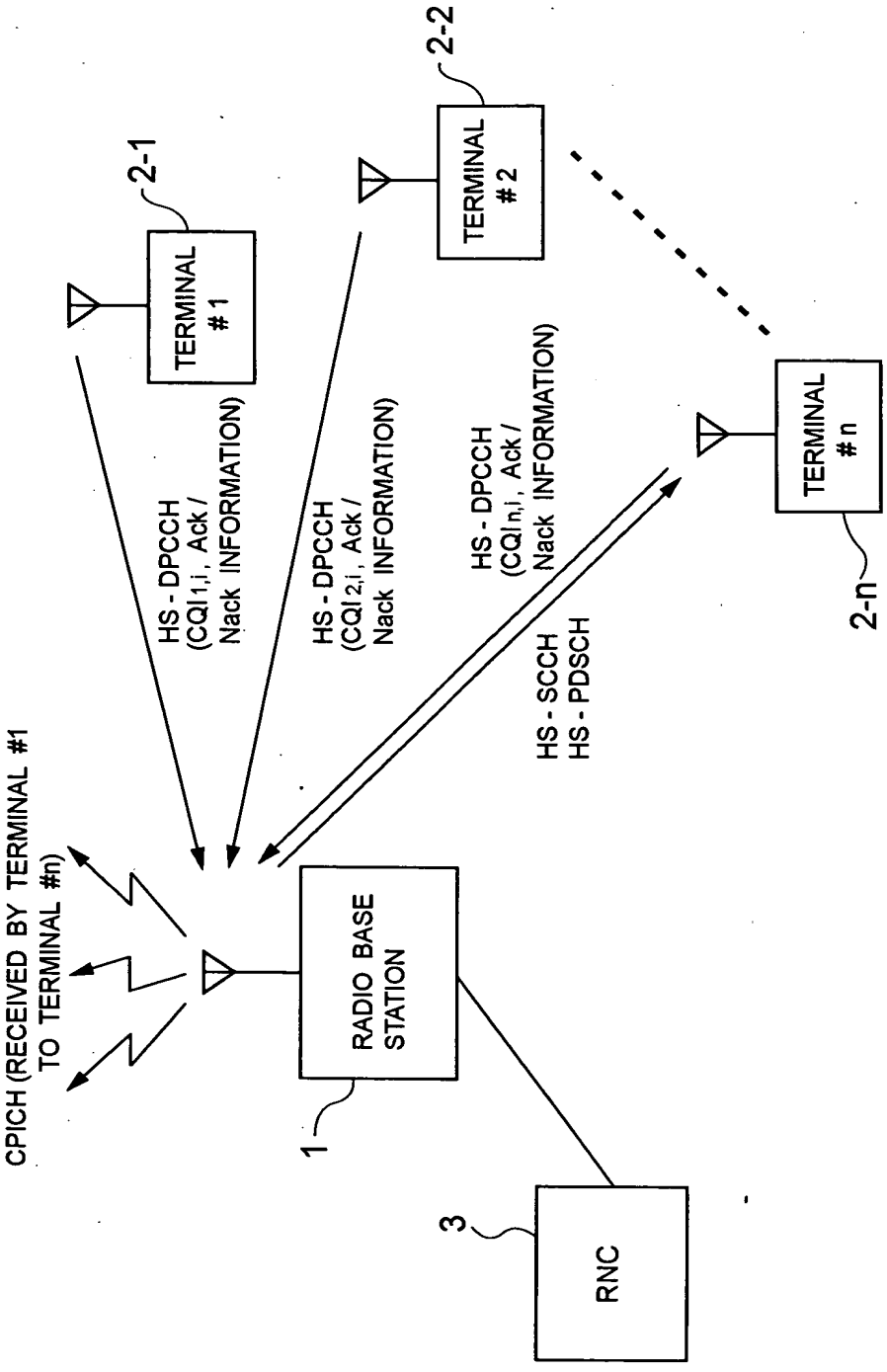
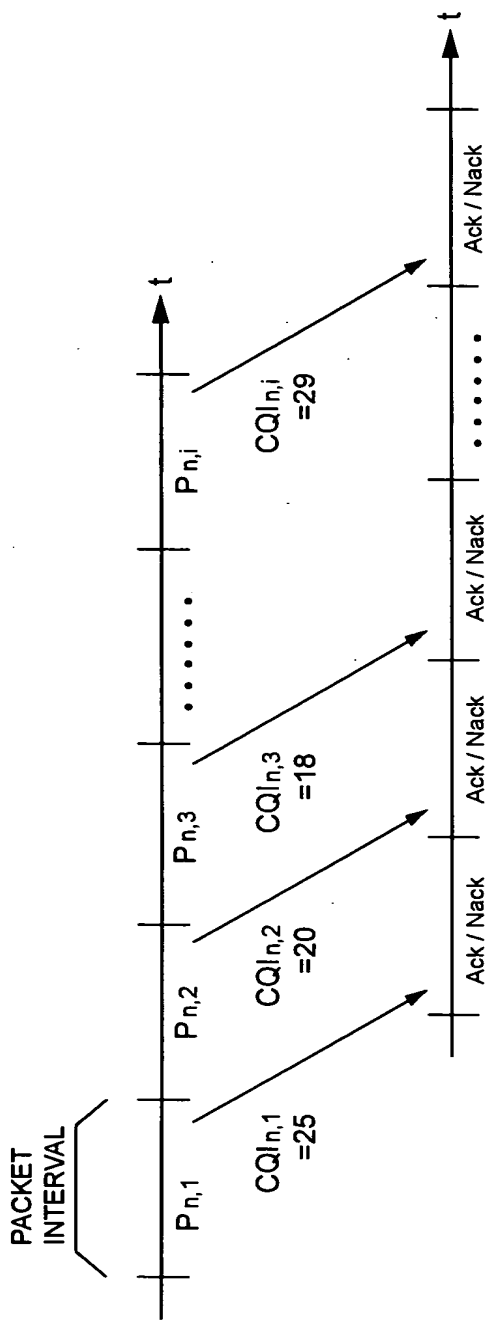

TERMINAL #1
2-1
TERMINAL #2
2-2
TERMINAL #n
2-n
HS - DPCCH (CQI 1,i , Ack / Nack INFORMATION)
HS - DPCCH (CQI 2,i , Ack / Nack INFORMATION)
HS - DPCCH (CQI n,i , Ack / Nack INFORMATION)
HS - SCCH HS - PDSCH
CPICH (RECEIVED BY TERMINAL #1 TO TERMINAL #n)
RADIO BASE STATION
1
RNC
3

FIG. 2



$P_{n,i}$: PACKET DATA TRANSMITTED AT TIME i TO TERMINAL #n FOR WHICH TRANSMISSION PARAMETER IS DETERMINED BASED ON CQI REPORT VALUE

$CQI_{n,i}$: CQI REPORT VALUE RECEIVED AT TIME i FROM TERMINAL

$Ack / NackInfor_{n,i}$: AcK / Nack REPORT VALUE FOR PACKET ($P_{n,i}$) OF TIME i, RECEIVED FROM TERMINAL #n

FIG. 3

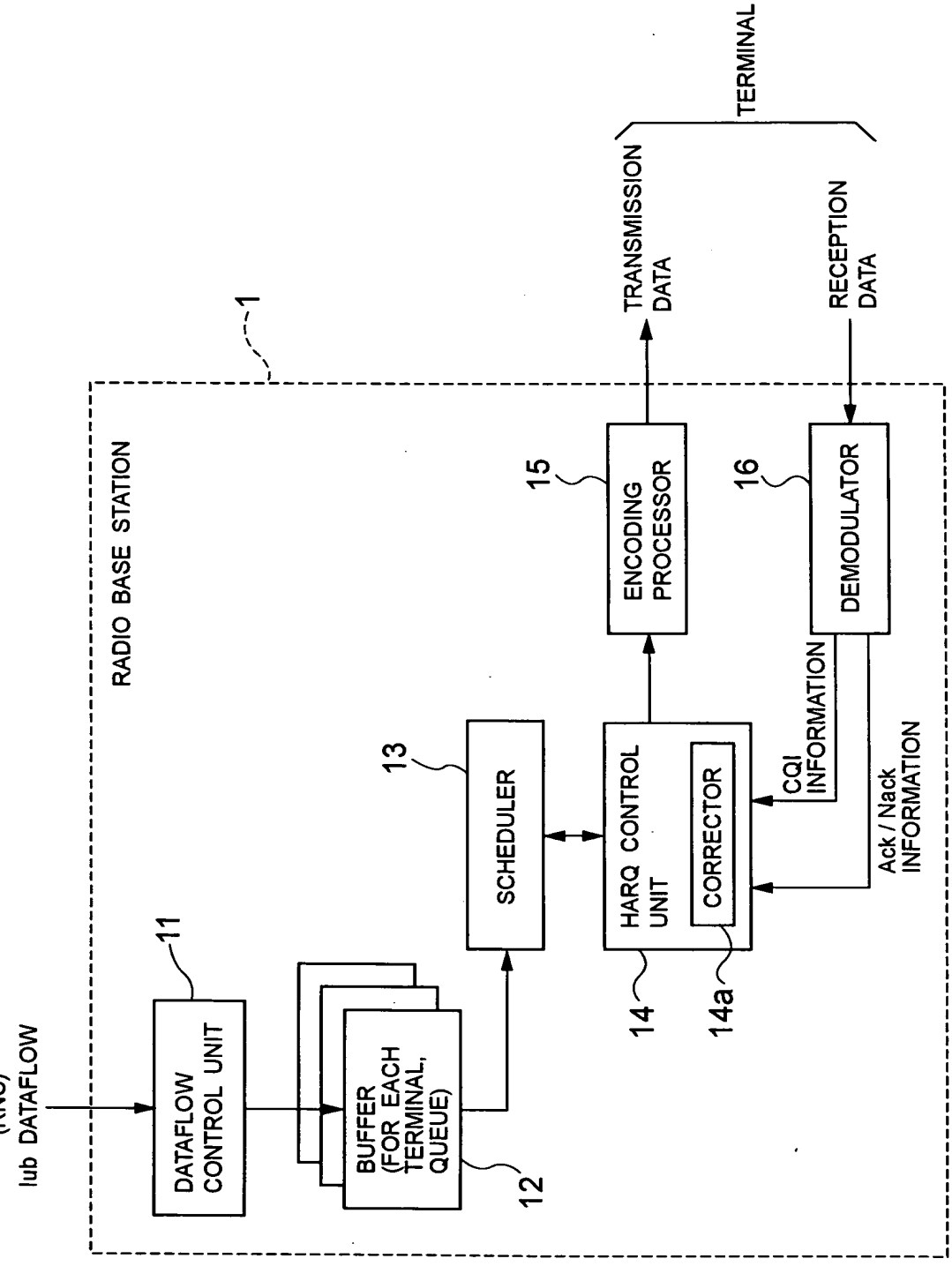

TERMINAL
TRANSMISSION DATA
RECEPTION DATA
1
RADIO BASE STATION
(RNC)
Iub DATAFLOW
DATAFLOW CONTROL UNIT
11
BUFFER (FOR EACH TERMINAL, QUEUE)
12
SCHEDULER
13
HARQ CONTROL UNIT
CORRECTOR
14
14a
ENCODING PROCESSOR
15
DEMODULATOR
16
CQI INFORMATION
Ack / Nack INFORMATION

FIG. 4

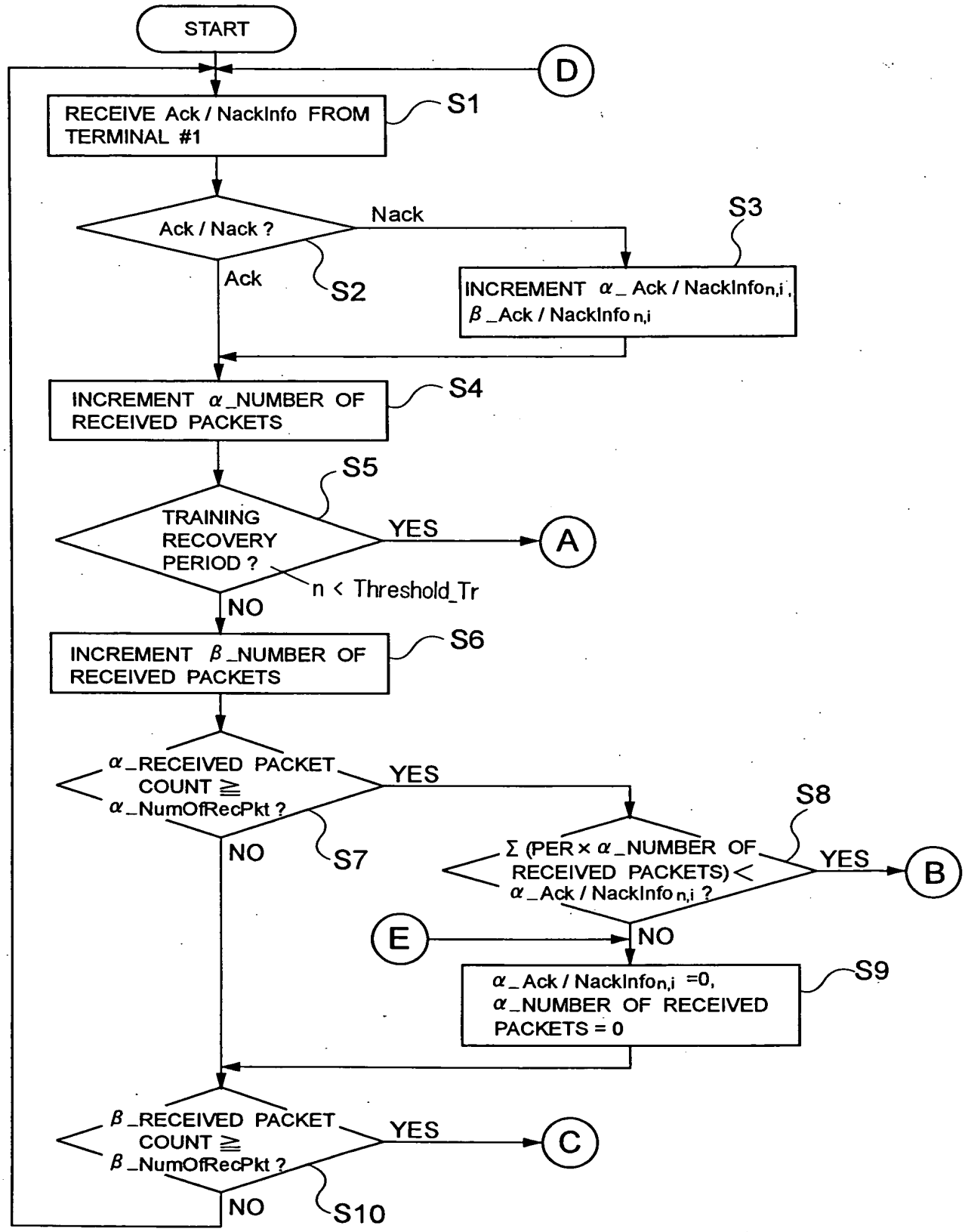

START
D
RECEIVE Ack / NackInfo FROM TERMINAL #1
S1
Ack / Nack ?
Nack
S3
Ack
S2
INCREMENT α_Ack / NackInfo n,i , β_Ack / NackInfo n,i
INCREMENT α_NUMBER OF RECEIVED PACKETS
S4
S5
TRAINING RECOVERY PERIOD ?
YES
A
n < Threshold_Tr
NO
INCREMENT β_NUMBER OF RECEIVED PACKETS
S6
α_RECEIVED PACKET COUNT ≧ α_NumOfRecPkt ?
YES
NO
S7
S8
Σ (PER × α_NUMBER OF RECEIVED PACKETS) < α_Ack / NackInfo n,i ?
YES
B
E
NO
α_Ack / NackInfo n,i =0, α_NUMBER OF RECEIVED PACKETS = 0
S9
β_RECEIVED PACKET COUNT ≧ β_NumOfRecPkt ?
YES
C
NO
S10

FIG. 5

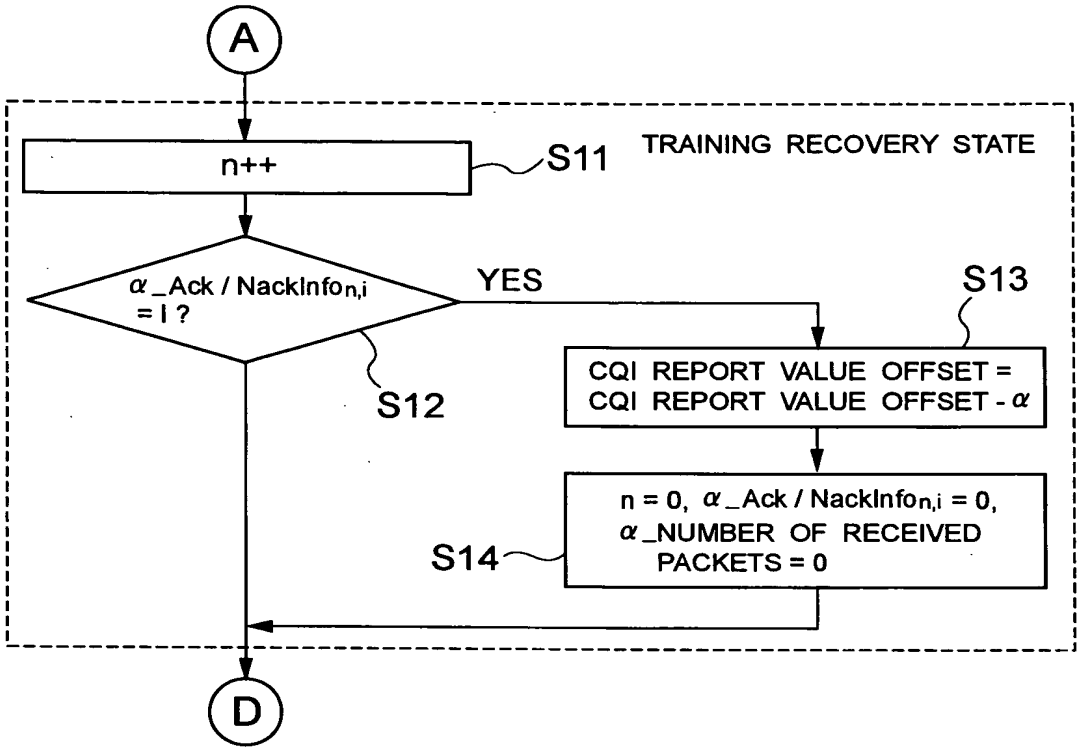

A
n++
S11
TRAINING RECOVERY STATE
α_Ack / NackInfo n,i = 1 ?
YES
S13
S12
CQI REPORT VALUE OFFSET = CQI REPORT VALUE OFFSET - α
n = 0, α_Ack / NackInfo n,i = 0, α_NUMBER OF RECEIVED PACKETS = 0
S14
D

FIG. 6

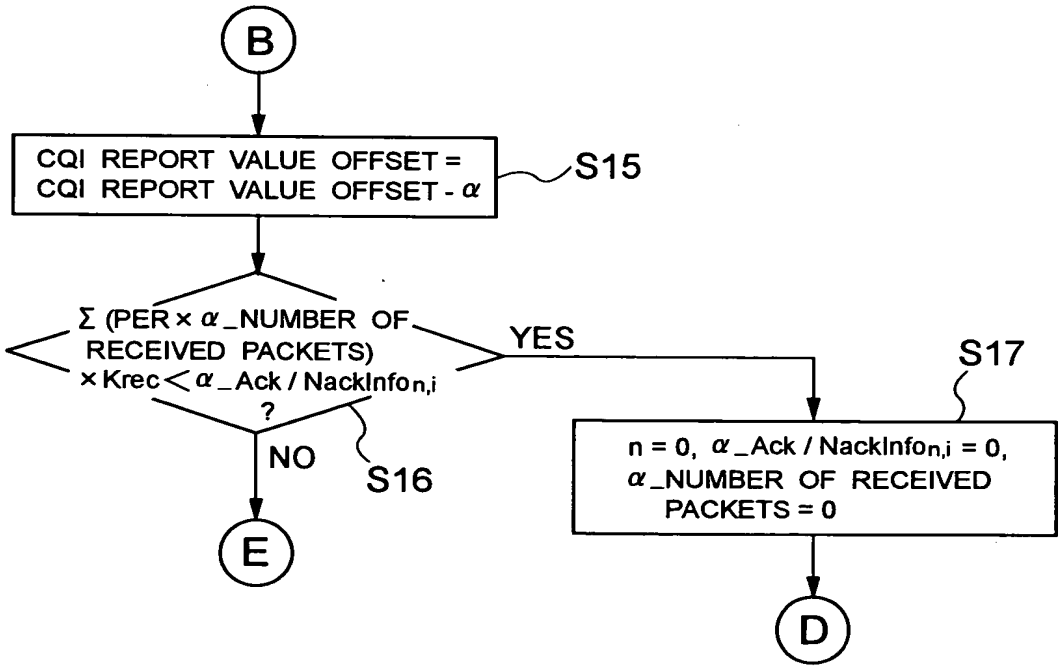

B
CQI REPORT VALUE OFFSET = CQI REPORT VALUE OFFSET - α
S15
Σ (PER × α_NUMBER OF RECEIVED PACKETS) × Krec < α_Ack / NackInfo n,i ?
YES
S17
NO
S16
n = 0, α_Ack / NackInfo n,i = 0, α_NUMBER OF RECEIVED PACKETS = 0
E
D

FIG. 7

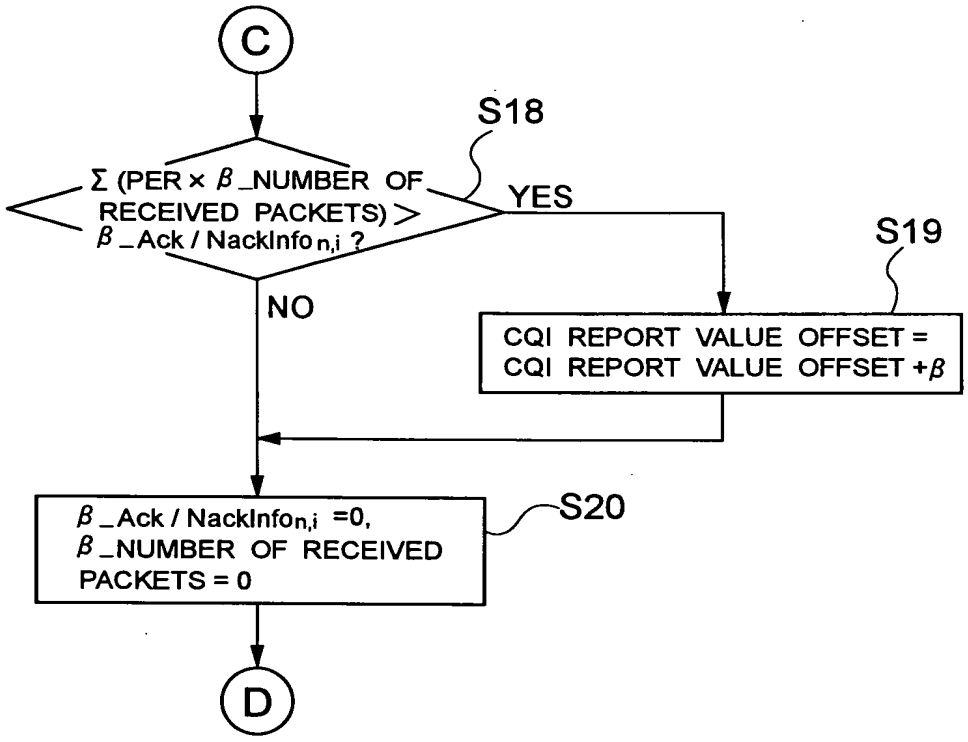

C
S18
Σ (PER × β_NUMBER OF RECEIVED PACKETS) > β_Ack / NackInfo n,i ?
YES
NO
S19
CQI REPORT VALUE OFFSET = CQI REPORT VALUE OFFSET +β
β_Ack / NackInfo n,i =0, β_NUMBER OF RECEIVED PACKETS = 0
S20
D

FIG. 8

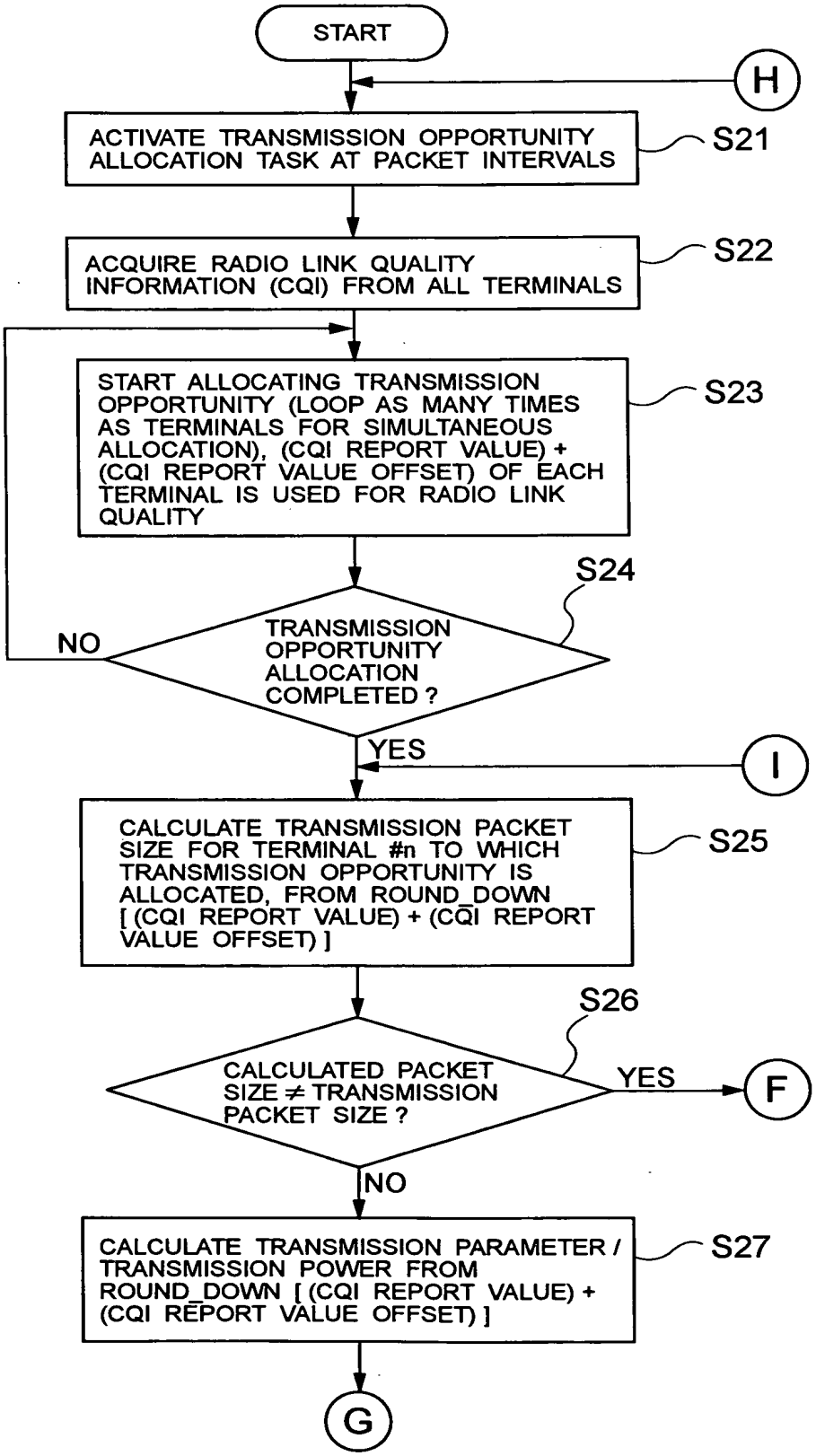

START
H
ACTIVATE TRANSMISSION OPPORTUNITY ALLOCATION TASK AT PACKET INTERVALS
S21
ACQUIRE RADIO LINK QUALITY INFORMATION (CQI) FROM ALL TERMINALS
S22
START ALLOCATING TRANSMISSION OPPORTUNITY (LOOP AS MANY TIMES AS TERMINALS FOR SIMULTANEOUS ALLOCATION), (CQI REPORT VALUE) + (CQI REPORT VALUE OFFSET) OF EACH TERMINAL IS USED FOR RADIO LINK QUALITY
S23
S24
TRANSMISSION OPPORTUNITY ALLOCATION COMPLETED ?
NO
YES
I
CALCULATE TRANSMISSION PACKET SIZE FOR TERMINAL #n TO WHICH TRANSMISSION OPPORTUNITY IS ALLOCATED, FROM ROUND_DOWN [(CQI REPORT VALUE) + (CQI REPORT VALUE OFFSET)]
S25
S26
CALCULATED PACKET SIZE ≠ TRANSMISSION PACKET SIZE ?
YES
F
NO
CALCULATE TRANSMISSION PARAMETER / TRANSMISSION POWER FROM ROUND_DOWN [(CQI REPORT VALUE) + (CQI REPORT VALUE OFFSET)]
S27
G

FIG. 9

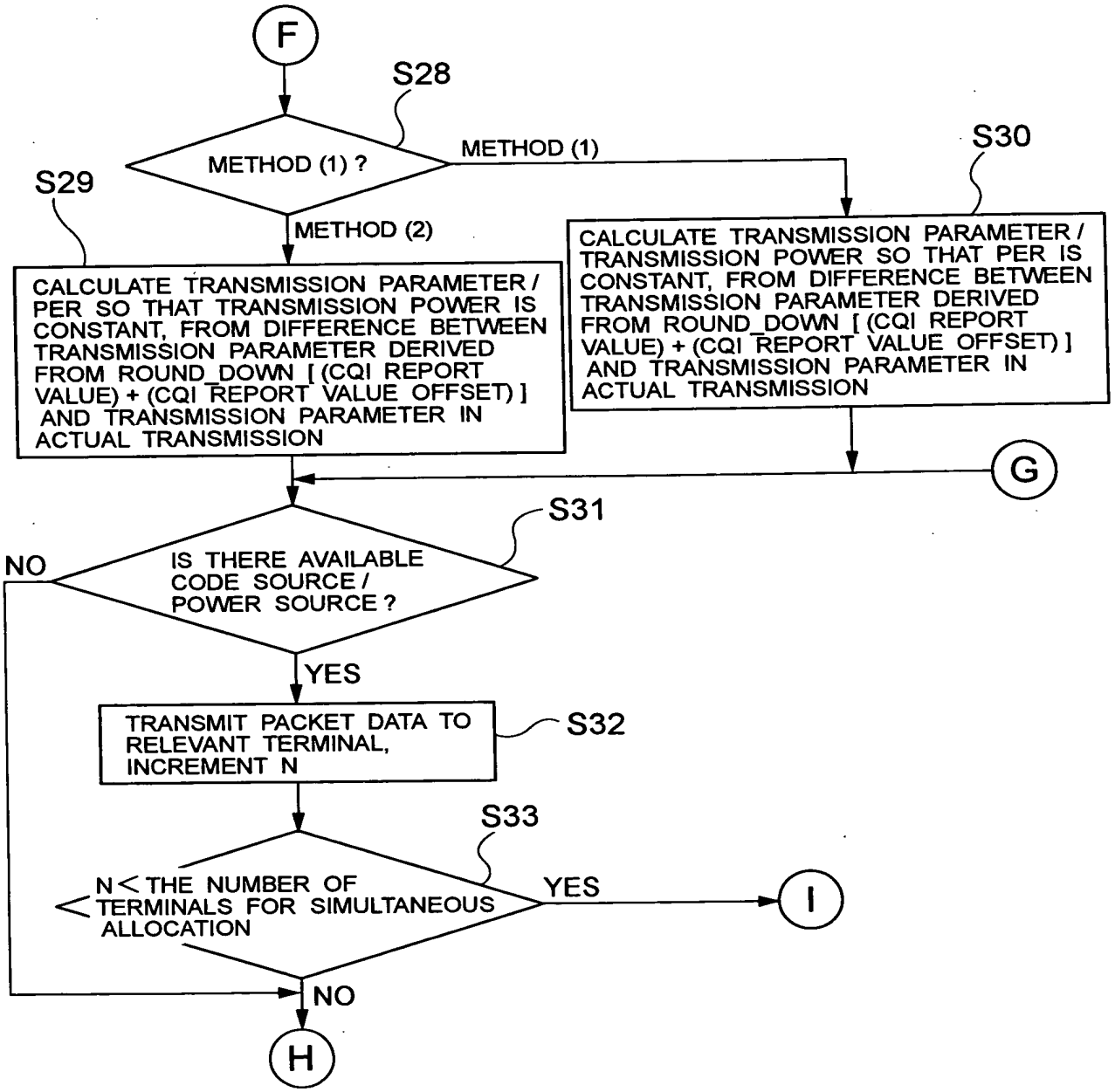

F
S28
METHOD (1) ?
METHOD (1)
S30
S29
METHOD (2)
CALCULATE TRANSMISSION PARAMETER / PER SO THAT TRANSMISSION POWER IS CONSTANT, FROM DIFFERENCE BETWEEN TRANSMISSION PARAMETER DERIVED FROM ROUND_DOWN [(CQI REPORT VALUE) + (CQI REPORT VALUE OFFSET)] AND TRANSMISSION PARAMETER IN ACTUAL TRANSMISSION
CALCULATE TRANSMISSION PARAMETER / TRANSMISSION POWER SO THAT PER IS CONSTANT, FROM DIFFERENCE BETWEEN TRANSMISSION PARAMETER DERIVED FROM ROUND_DOWN [(CQI REPORT VALUE) + (CQI REPORT VALUE OFFSET)] AND TRANSMISSION PARAMETER IN ACTUAL TRANSMISSION
G
S31
NO
IS THERE AVAILABLE CODE SOURCE / POWER SOURCE ?
YES
TRANSMIT PACKET DATA TO RELEVANT TERMINAL, INCREMENT N
S32
S33
N < THE NUMBER OF TERMINALS FOR SIMULTANEOUS ALLOCATION
YES
I
NO
H

FIG. 10

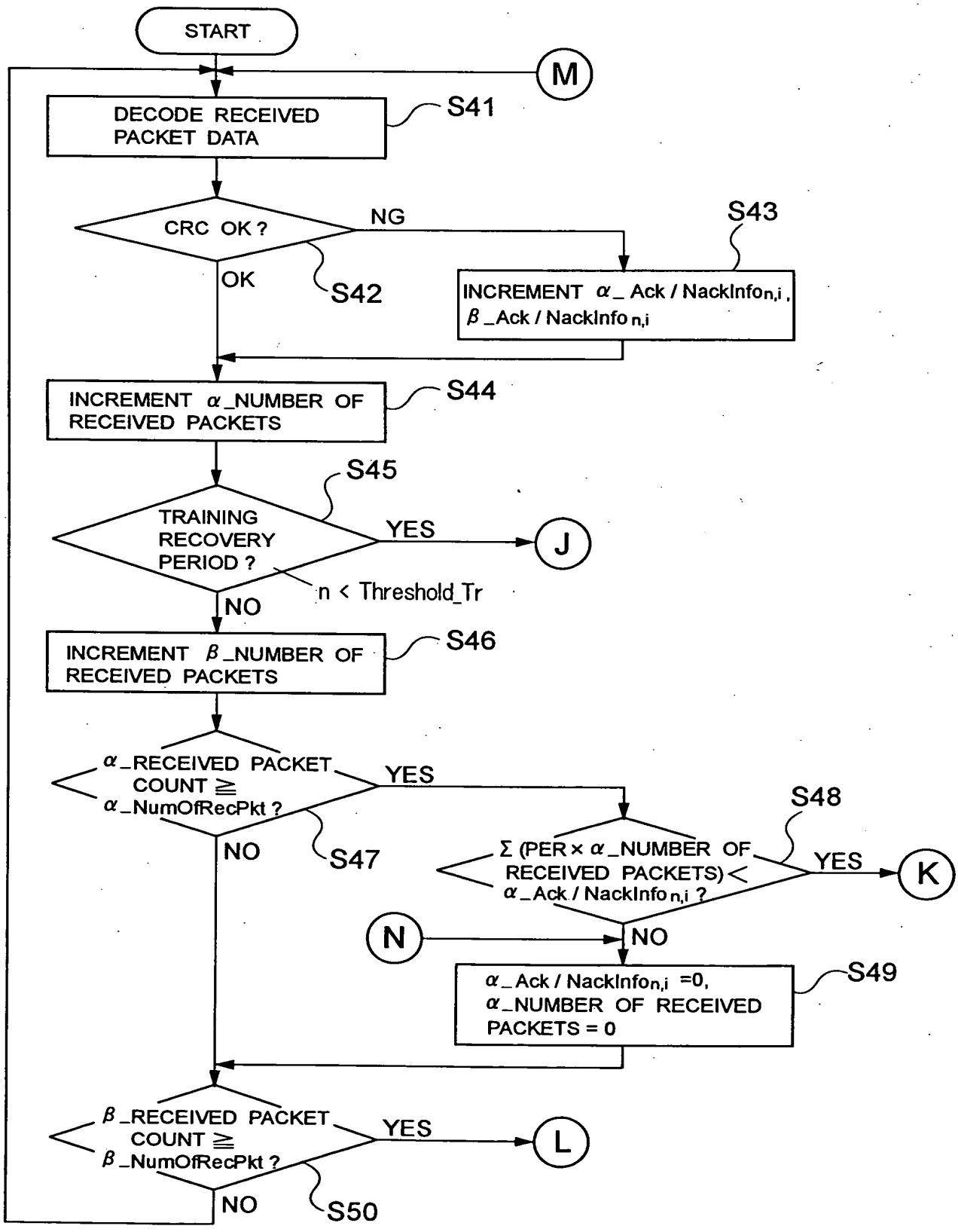

START
M
DECODE RECEIVED PACKET DATA
S41
CRC OK ?
NG
S43
OK
S42
INCREMENT α_ Ack / NackInfo n,i , β _Ack / NackInfo n,i
INCREMENT α_NUMBER OF RECEIVED PACKETS
S44
S45
TRAINING RECOVERY PERIOD ?
YES
J
n < Threshold_Tr
NO
INCREMENT β_NUMBER OF RECEIVED PACKETS
S46
α_RECEIVED PACKET COUNT ≧ α_NumOfRecPkt ?
YES
S48
NO
S47
Σ (PER × α_NUMBER OF RECEIVED PACKETS) < α_Ack / NackInfo n,i ?
YES
K
N
NO
α_ Ack / NackInfo n,i =0, α_NUMBER OF RECEIVED PACKETS = 0
S49
β_RECEIVED PACKET COUNT ≧ β_NumOfRecPkt ?
YES
L
NO
S50

FIG. 11

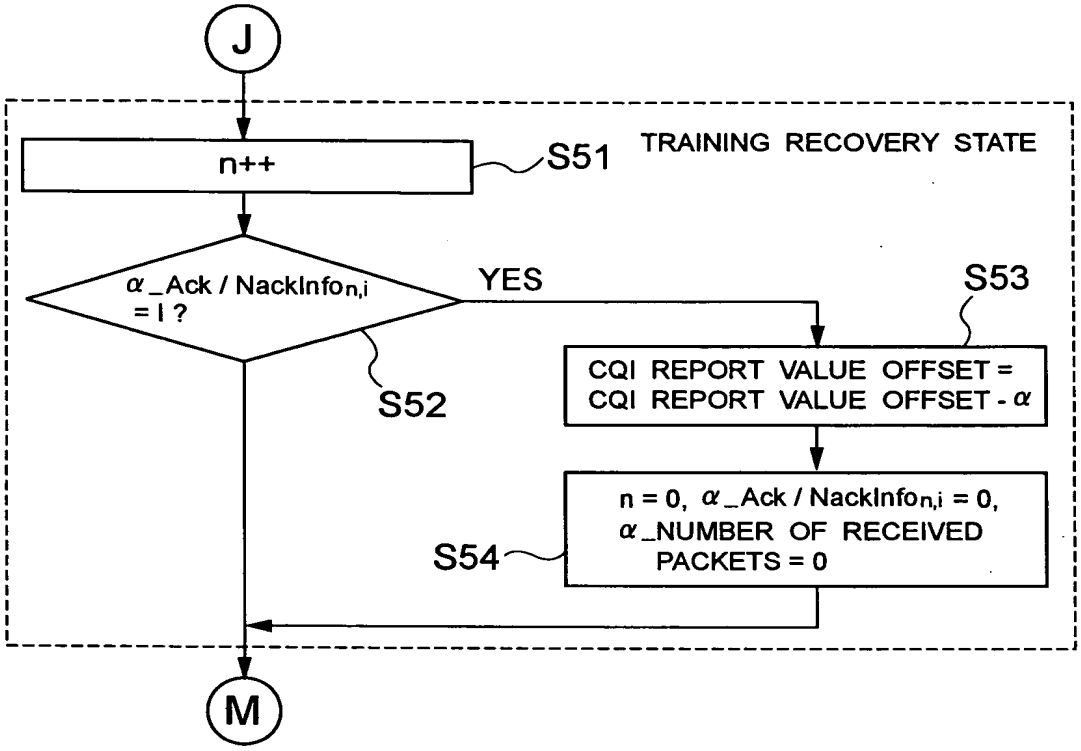

J
TRAINING RECOVERY STATE
n++
S51
α_Ack / NackInfo n,i = I ?
YES
S53
S52
CQI REPORT VALUE OFFSET = CQI REPORT VALUE OFFSET - α
n = 0, α_Ack / NackInfo n,i = 0, α_NUMBER OF RECEIVED PACKETS = 0
S54
M

FIG. 12

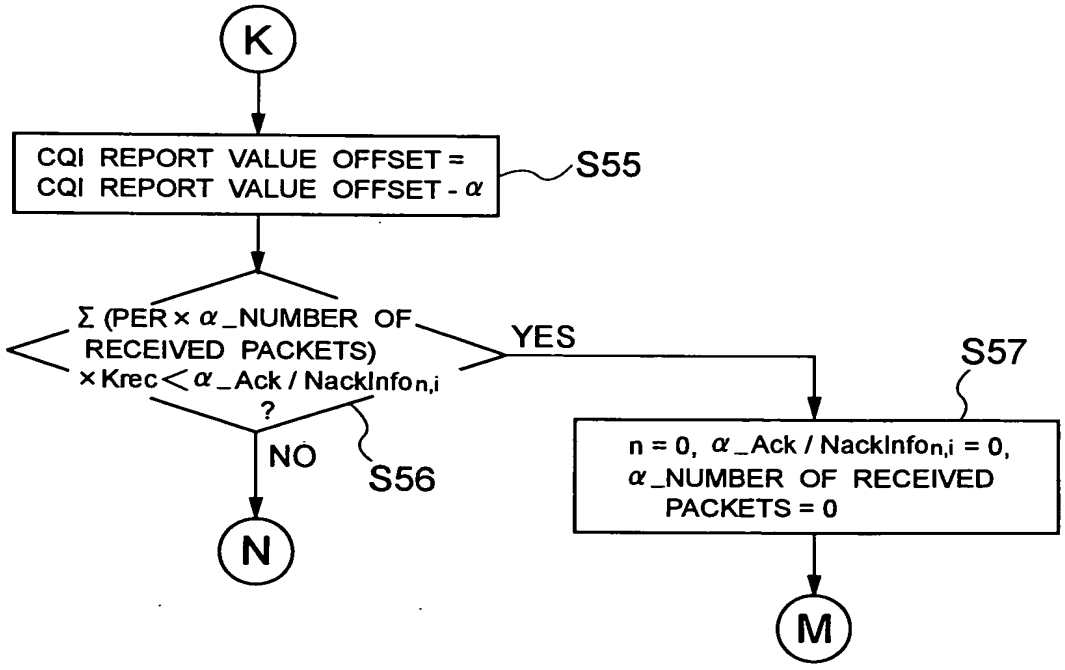

K
CQI REPORT VALUE OFFSET = CQI REPORT VALUE OFFSET - α
S55
Σ (PER × α_NUMBER OF RECEIVED PACKETS) × Krec < α_Ack / NackInfo n,i ?
YES
S57
NO
S56
n = 0, α_Ack / NackInfo n,i = 0, α_NUMBER OF RECEIVED PACKETS = 0
N
M

FIG. 13

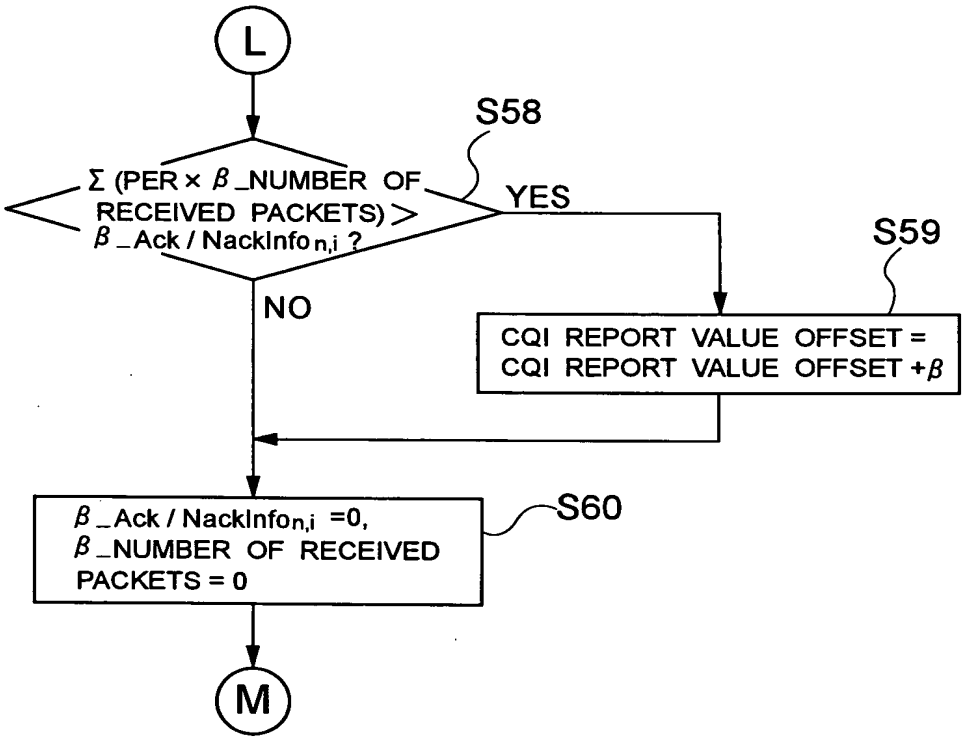

L
S58
Σ (PER × β_NUMBER OF RECEIVED PACKETS) > β_Ack / NackInfo n,i ?
YES
NO
S59
CQI REPORT VALUE OFFSET = CQI REPORT VALUE OFFSET +β
β_Ack / NackInfo n,i =0, β_NUMBER OF RECEIVED PACKETS = 0
S60
M

FIG. 14

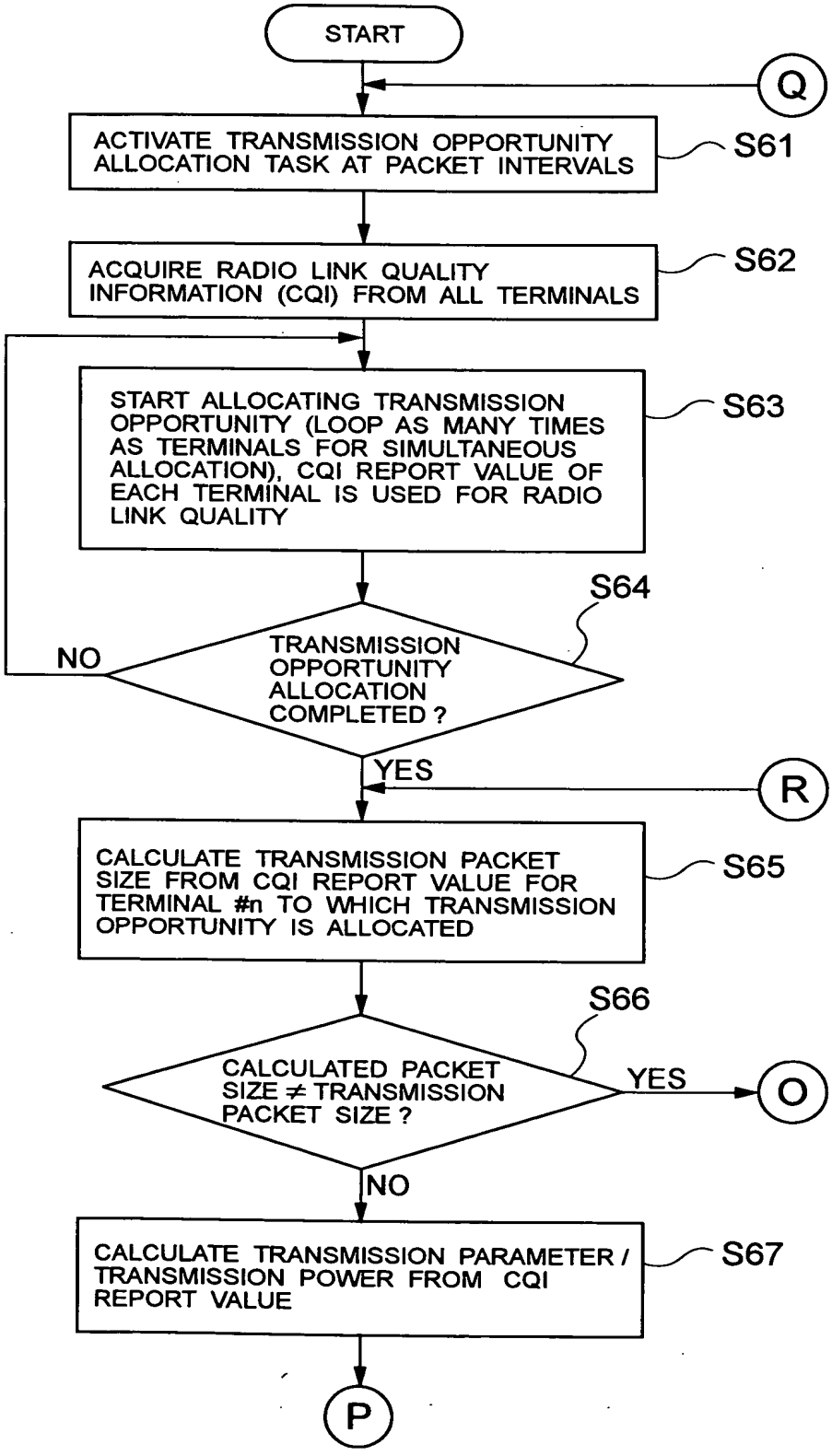

START
Q
ACTIVATE TRANSMISSION OPPORTUNITY ALLOCATION TASK AT PACKET INTERVALS
S61
ACQUIRE RADIO LINK QUALITY INFORMATION (CQI) FROM ALL TERMINALS
S62
START ALLOCATING TRANSMISSION OPPORTUNITY (LOOP AS MANY TIMES AS TERMINALS FOR SIMULTANEOUS ALLOCATION), CQI REPORT VALUE OF EACH TERMINAL IS USED FOR RADIO LINK QUALITY
S63
S64
TRANSMISSION OPPORTUNITY ALLOCATION COMPLETED ?
NO
YES
R
CALCULATE TRANSMISSION PACKET SIZE FROM CQI REPORT VALUE FOR TERMINAL #n TO WHICH TRANSMISSION OPPORTUNITY IS ALLOCATED
S65
S66
CALCULATED PACKET SIZE ≠ TRANSMISSION PACKET SIZE ?
YES
O
NO
CALCULATE TRANSMISSION PARAMETER / TRANSMISSION POWER FROM CQI REPORT VALUE
S67
P

FIG. 15

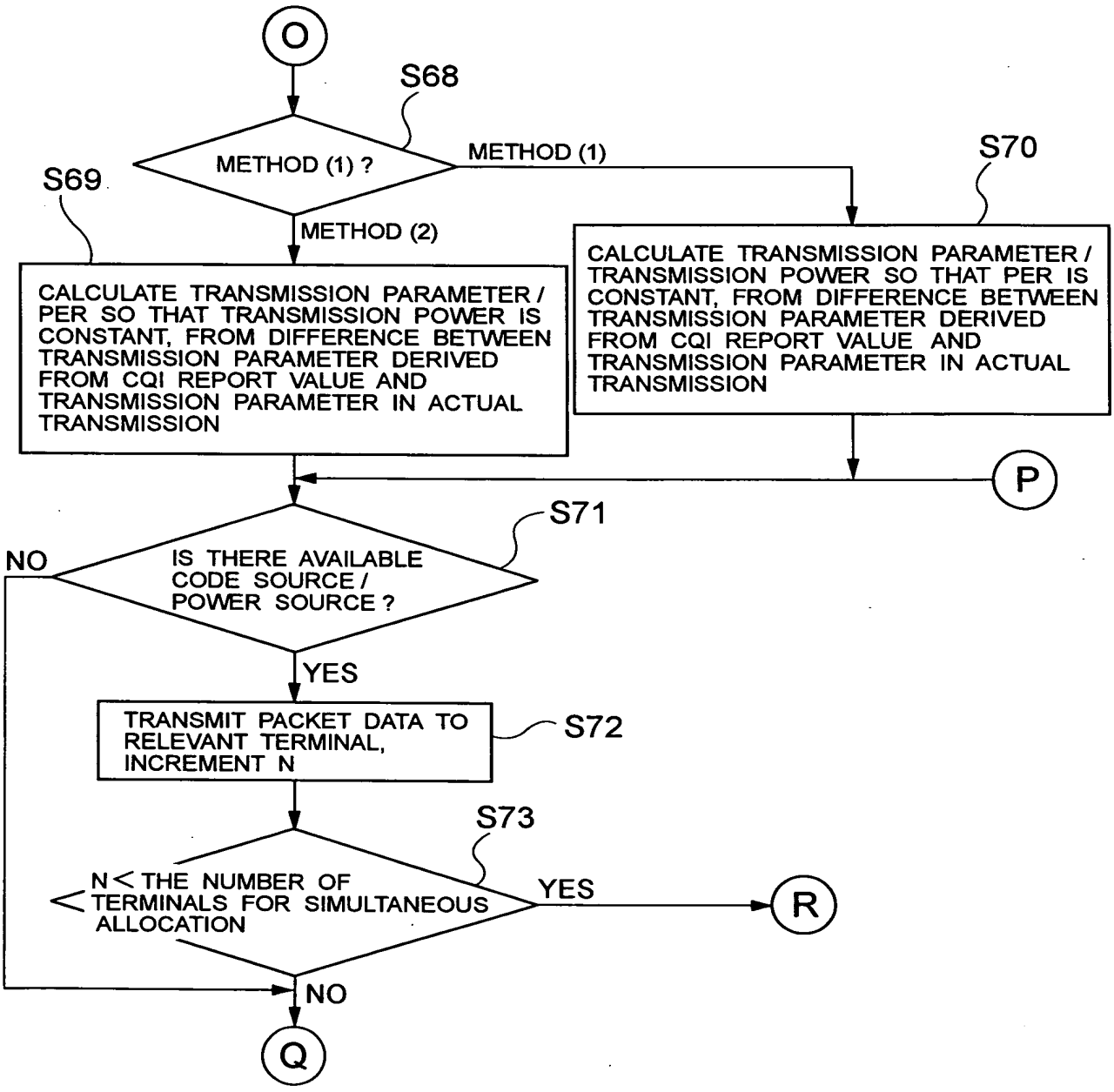
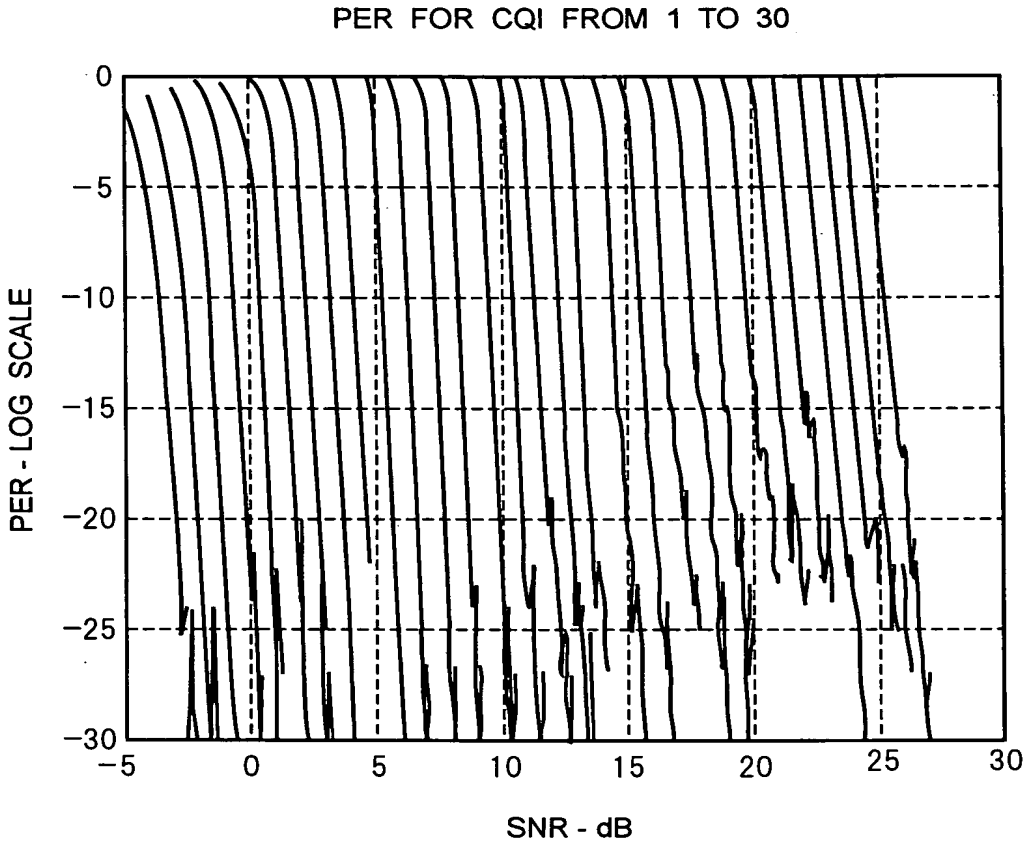

O
S68
METHOD (1) ?
METHOD (1)
S70
S69
METHOD (2)
CALCULATE TRANSMISSION PARAMETER / TRANSMISSION POWER SO THAT PER IS CONSTANT, FROM DIFFERENCE BETWEEN TRANSMISSION PARAMETER DERIVED FROM CQI REPORT VALUE AND TRANSMISSION PARAMETER IN ACTUAL TRANSMISSION
CALCULATE TRANSMISSION PARAMETER / PER SO THAT TRANSMISSION POWER IS CONSTANT, FROM DIFFERENCE BETWEEN TRANSMISSION PARAMETER DERIVED FROM CQI REPORT VALUE AND TRANSMISSION PARAMETER IN ACTUAL TRANSMISSION
P
S71
NO
IS THERE AVAILABLE CODE SOURCE / POWER SOURCE ?
YES
TRANSMIT PACKET DATA TO RELEVANT TERMINAL, INCREMENT N
S72
S73
N < THE NUMBER OF TERMINALS FOR SIMULTANEOUS ALLOCATION
YES
R
NO
Q

FIG. 16

CQI VALUE	TRANSPORT BLOCK SIZE	NUMBER OF HS - PDSCH	MODULATION
0	N/A	OUT OF RANGE	
1	137	1	QPSK
2	173	1	QPSK
3	233	1	QPSK
4	317	1	QPSK
5	377	1	QPSK
6	461	1	QPSK
7	650	2	QPSK
8	792	2	QPSK
9	931	2	QPSK
10	1262	3	QPSK
11	1483	3	QPSK
12	1742	3	QPSK
13	2279	4	QPSK
14	2583	4	QPSK
15	3319	5	QPSK
16	3565	5	16-QAM
17	4189	5	16-QAM
18	4664	5	16-QAM
19	5287	5	16-QAM
20	5887	5	16-QAM
21	6554	5	16-QAM
22	7168	5	16-QAM
23	9719	7	16-QAM
24	11418	8	16-QAM
25	14411	10	16-QAM
26	17300	12	16-QAM
27	21754	15	16-QAM
28	23370	15	16-QAM
29	24222	15	16-QAM
30	25558	15	16-QAM

FIG. 17


PER FOR CQI FROM 1 TO 30
PER - LOG SCALE
0
−5
−10
−15
−20
−25
−30
−5
0
5
10
15
20
25
30
SNR - dB